National Weather Service Dodge City Kansas

Wild West Weather

Summer 2018

In This Issue

This newsletter is produced by the National Weather Service Office in Dodge City, KS. Comments & suggestions can be sent to:
w-ddc.webmaster@noaa.gov

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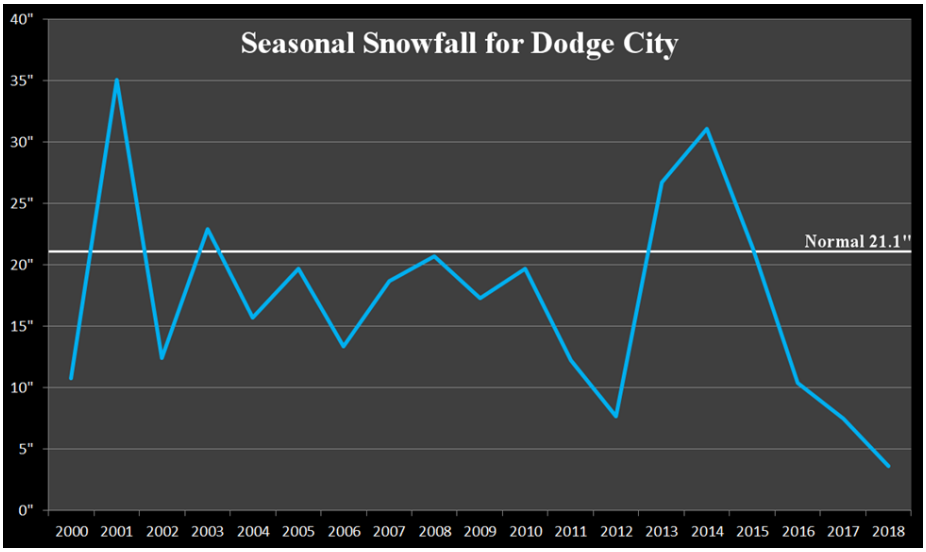
Winter in Review



2017/2018 winter season Snowfall for Dodge City was well below normal amounts.

By Jeff Hutton, Warning Coordination Meteorologist

This past winter across the High Plains was characterized by well below normal precipitation (and snowfall) but near normal temperatures. At Dodge City for instance, snowfall for just the winter months of December, January and February was only 1.4 inches! This was not a record low amount, but it was 11.5 inches less than normal.

For the season (Sept-May) at Dodge City, the total was only 3.6 inches, which ranks as the 3rd lowest since 1885, which is the year snowfall measurements began. The record lowest amount of snow in Dodge City for a season was 0.2 inches observed in 1903/1904. Elsewhere across the region this past winter, snowfall was similar.

This makes the third season in a row of significantly below normal snowfall. In fact, 14 of the last 19 seasons have had below average snowfall for Dodge City!

Precipitation across the high plains was actually above normal

CONTINUED ON NEXT PAGE...

in Northwest Kansas. But the majority of the region observed well below normal amounts.

Precipitation since the fall (October 1) has been dismal but not the lowest on record. There were a couple of events in early October, but really nothing of consequence again until March 18th. Precipitation then occurred several times during the latter half of April. But, deficits of moisture were still very high and it will take a while to get that made up (Figures 1 and 2).

Temperatures this past winter were up and down as usual. There were a few mild periods, but there were also some very cold outbreaks. Temperatures of below zero (F) were observed across the region several times in December, January and February. Overall, December and January were a little above normal while February was the coldest month. For Dodge City the average temperature of 33.6 degrees for the entire three month period of December through February was exactly normal.

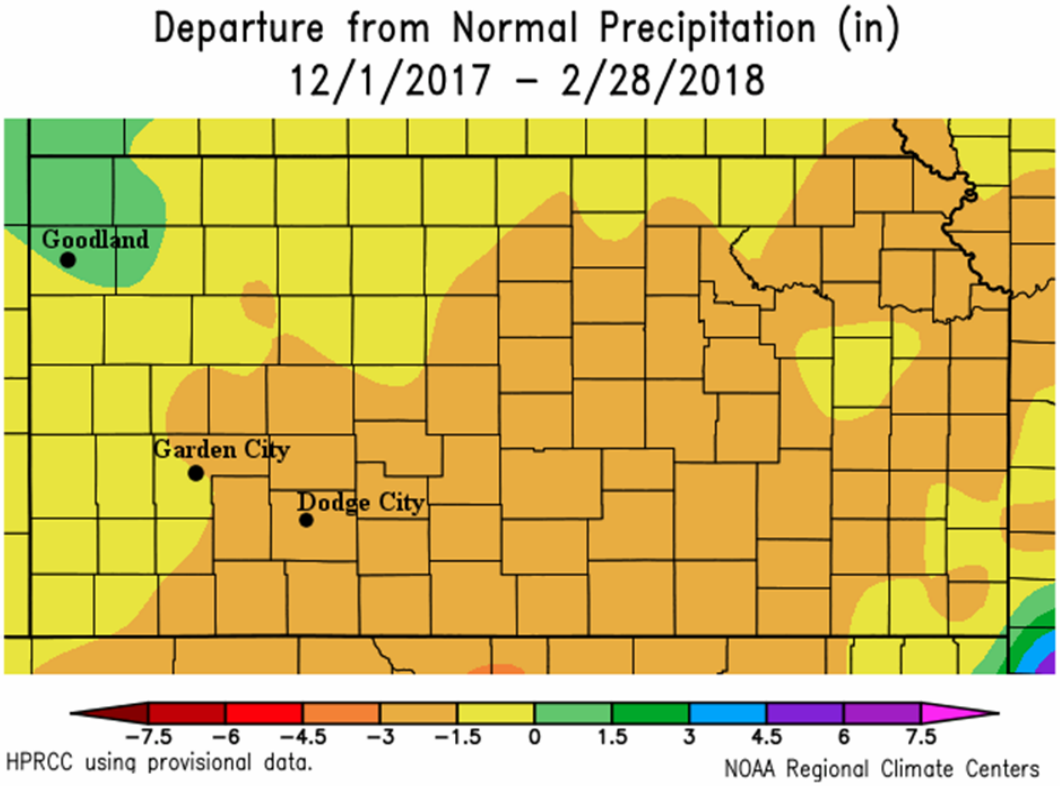


Figure 1. Figure on the left shows departure from normal precipitation amounts from December 1, 2017 to February 28, 2018.

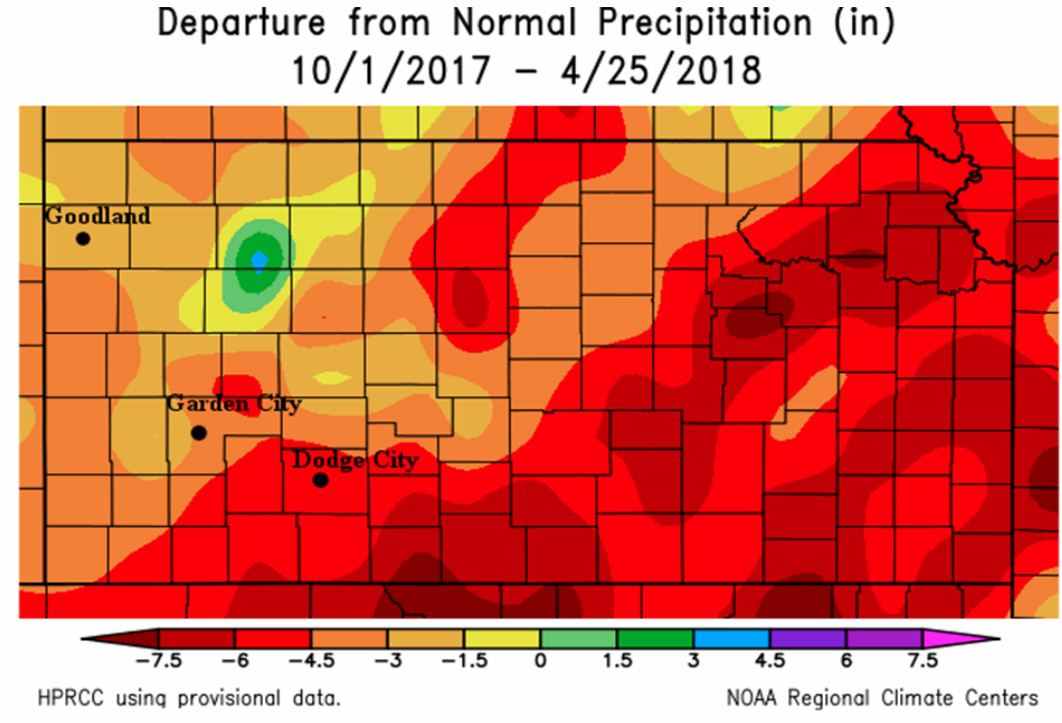
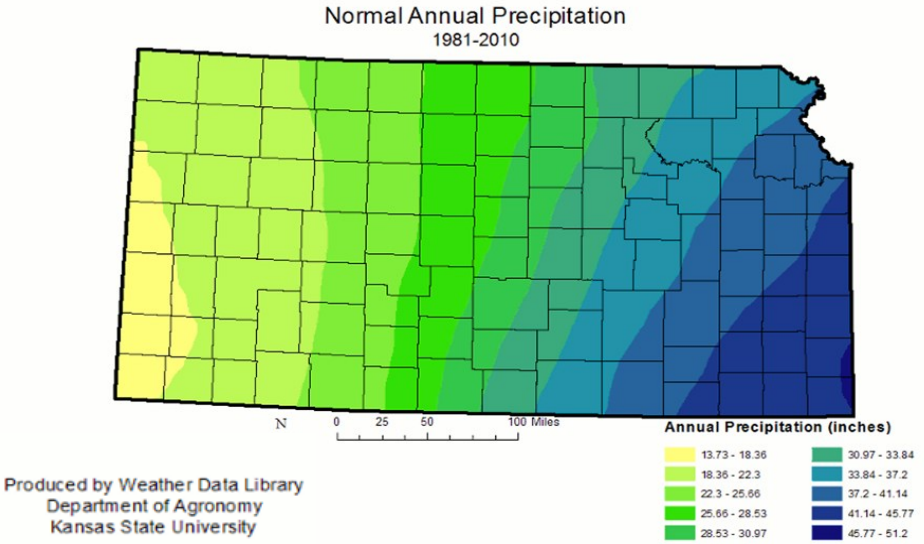


Figure 2. Figure on the left shows departure from normal precipitation amounts from October 1, 2017 to April 25, 2018 (longer time range than the above image).

Why Does Eastern Kansas Receives So Much More Rainfall Than Western Kansas?

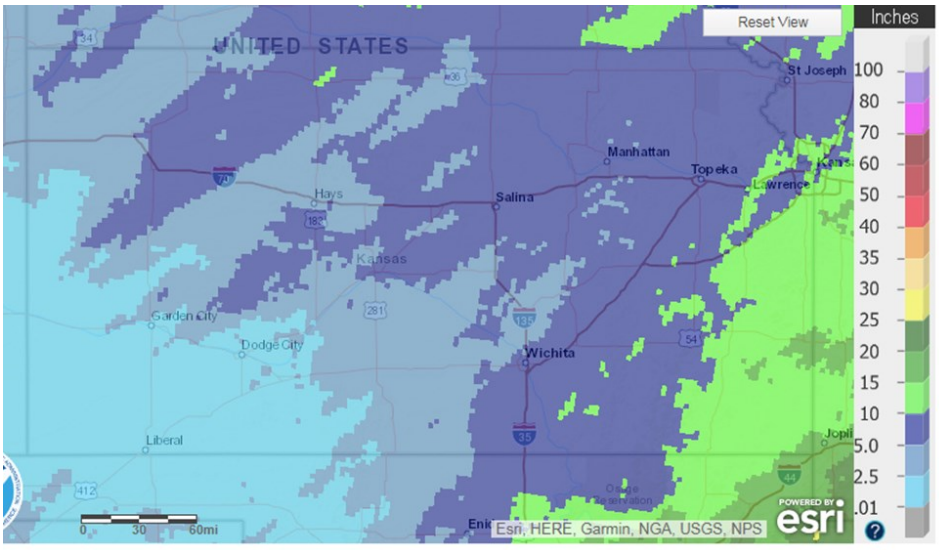
By Jonathan Finch, Meteorologist

Why does eastern Kansas receive so much more precipitation than western Kansas? Annual precipitation generally increases from west to east across Kansas, especially over the long term when yearly variability is averaged out. The image to the right shows average annual precipitation for Kansas for 1981 to 2010. In far western Kansas near the Colorado state line, from Elkhart northward to Syracuse, roughly 13" to 18" of precipitation can be expected during an average year. In contrast, in extreme southeastern Kansas along the Missouri border, 45 to 50" occurs in an average year. In between there is a gradient in precipitation from west to east.



Average annual preciptiation for Kansas for 1981 to 2010.

Much of the water vapor that condenses into clouds and results in precipitation in central and western Kansas comes from the Gulf of Mexico. When winds are southerly, moisture from this warm body of water moves northward into the Great Plains. The western limit to this moisture is roughly defined by the western edge of the Gulf of Mexico, which is about the same longitude as Wichita, KS or Pratt, KS. As a result, areas of precipitation often develop in these areas and move eastward or northeastward, leaving western Kansas dry. As the batches of precipitation move eastward, they often become more widespread and this results in heavier amounts farther east. Once in a while, instead of southerly winds, the winds are from the southeast. This allows moisture to progress farther west in Kansas, giving locations such as Dodge City, Garden City, Liberal, Scott City, Elkhart and Syracuse better chances for precipitation. Additionally, western Kansas benefits from slow moving storm systems while fast moving systems mainly bring rain to the eastern half of the state. However, most systems that move across the Rockies are fast moving. Once in a while, a slow moving system approaches from the west and intensifies over the southern plains, giving low-level moisture plenty of time to advance into western Kansas from the southeast. These setups can result in heavy rainfall, severe weather or winter storms in western Kansas.



Total precipitation received in Kansas from October 1, 2017 to March 28, 2018. Credit: Advanced Hydrologic Prediction Service (AHPS)

The winter of 2017-18 was dominated by fast-moving systems across the Rockies and Great Plains so that most of the precipitation was to the east. The image on the left shows total precipitation for Kansas for October 1, 2017 to March 28, 2018. The southeastern corner of the state received from 10 to 15 inches of precipitation while less than 2 inches fell across much of southwestern Kansas. This led to drought conditions across much of the southern and central high plains from the Texas Panhandle northward into southwestern Kansas.

Summer Outlook for Western Kansas

By Larry Ruthi, Meteorologist in Charge

The seasonal forecast for last winter issued in October called for persistent upper level ridging in the eastern Pacific and western Canada with a few instances of upper level lows closing off in the southwestern United States and subsequently propagating into the Central Plains. Temperatures were expected to be slightly above average, and precipitation was expected to be near to above average in western Kansas. Confidence in the precipitation forecast was very low with considerable variability expected depending on the paths taken by upper level lows. The general flow regime with persistent ridging in the eastern Pacific and western Canada verified well, and there were several upper level lows that closed off and moved into the Central Plains. Temperatures for the winter season were slightly above seasonal averages and verified well. Unfortunately, the precipitation forecast did not fare as well. The closed lows followed trajectories farther north than expected, and most precipitation fell north of southwestern Kansas. Precipitation for the winter season was well above average in northeast Colorado, far northwest Kansas and western Nebraska with some areas receiving 200% of average precipitation. Southwest Kansas, on the other hand, experienced dry, southwest winds in the warm sector of the low pressure systems and conditions highly favorable for wildfires.

So what may happen this summer? The Pacific Decadal Oscillation (PDO), a pattern of temperatures in the northern Pacific Ocean that can affect temperature and moisture patterns in the United States, was in a positive phase last summer and continued to be weakly positive during the winter months. However the PDO has trended toward a nearly neutral phase with cooling in the eastern North Pacific off the west coast of Canada. The PDO likely will be nearly neutral this summer, and the dryness observed in the Dakotas last summer may shift southward toward the Central Plains. If the PDO actually becomes negative, the probability of dryness in the southwestern United States extending into southwestern Kansas will increase.

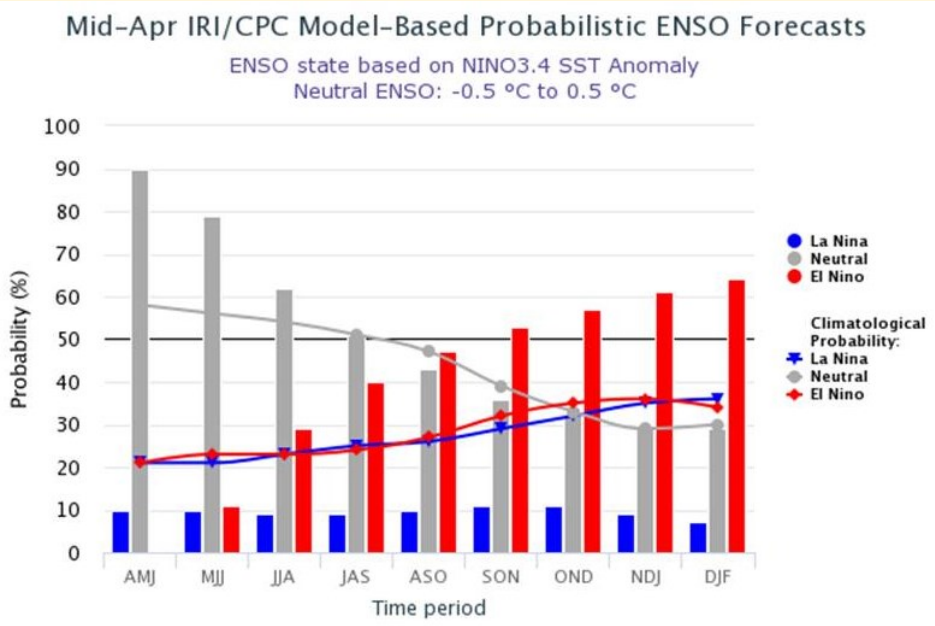


Figure 1: This chart depicts chances for El Nino, La Nina and Neutral conditions in the tropical Pacific. The red bars depict the increasing chances for development of El Nino this fall and winter.

The El Nino Southern Oscillation (ENSO), a variation in ocean temperatures in the equatorial Pacific Ocean, has trended toward a neutral condition after a weak to moderate La Nina during the winter months (Figure 1). Very warm water below the surface in the eastern equatorial Pacific (Figure 2) suggests that the La Nina is fading, and it is likely that neutral conditions will persist this summer. A trend toward warmer than average temperatures in the eastern equatorial Pacific is likely to evolve by the late summer or fall of 2018. There is little correlation between ENSO and warm season precipitation in the central United States, although there is some weak correlation between El Nino and above average precipitation in the summer months. If a warm event evolves as seems possible toward the late summer and fall, a trend toward increasing chances for moisture will exist by August and September.

Atlantic basin temperatures have become less uniformly positive since 2015 with anomalously cold temperatures in the north and warm temperatures in the tropical Atlantic. The Atlantic Multidecadal Oscillation (AMO) has trended toward negative

values for the first time since the 1990s. A negative AMO is correlated with above average precipitation, but it is unclear how the large variations in ocean temperatures from north to south in the Atlantic basin will affect this correlation.

Past years with large scale forcing roughly similar to this year exhibited considerable variability, although the best analogs favored below average rainfall. There were no years that provided a really good match to this summer with a weakening PDO after several years of strongly positive values and a neutral ENSO following a La Nina. Seasonal forecasts from numerical models also had considerable variability, although most models favor a warm and dry solution for southwestern Kansas.

The preponderance of evidence favors a summer characterized by below average rainfall during the May through July period with a return to average or above average rainfall from late summer into fall. Temperatures are likely to average above climatology. Confidence in below average rainfall in the southwestern United States is high, and this area of dryness is likely to encroach on southwestern Kansas. Confidence in seasonal forecasting is even lower in the warm season than the cold season due to the small scale variabilities inherent in thunderstorm development and feedback mechanisms that favor repeated rainfall events in areas with moist soil and persistent heat and dryness in areas with dry soil.

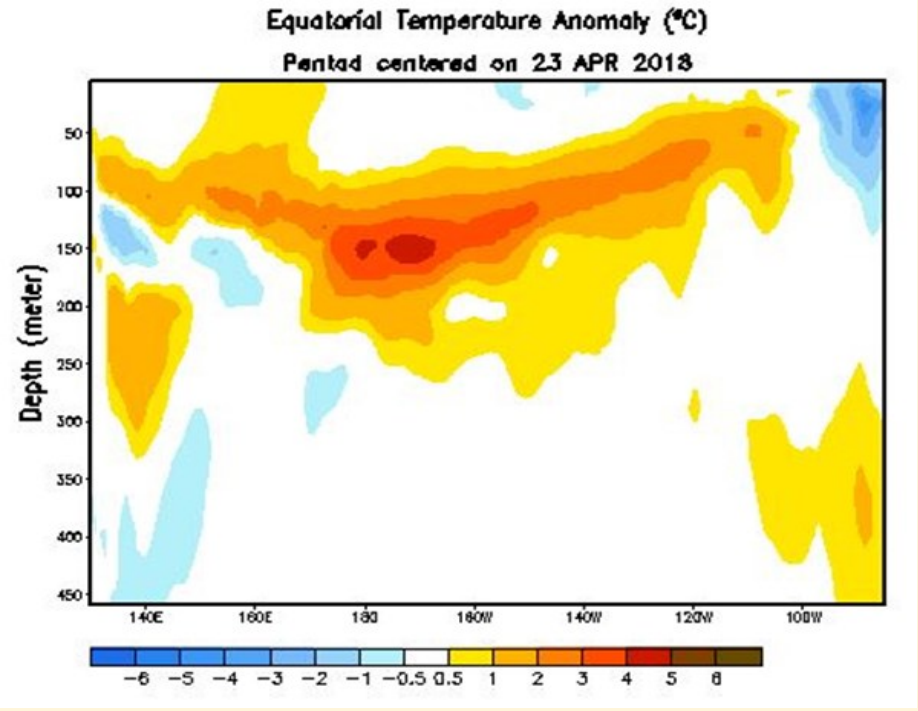
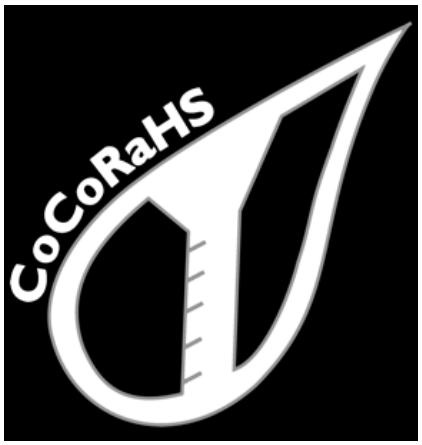


Figure 2: This chart depicts water temperatures in the equatorial Pacific Ocean. Note the warm subsurface temperatures with very little cold water left near the surface.

Want to become a weather observer?

Join CoCoRaHS! The Community Collaborative Rain, Hail and Snow Network



We are looking for additional precipitation observers across Southwest Kansas for the CoCoRaHS program!

CoCoRaHS is a community-based network of volunteers who take daily measurements of precipitation, snowfall and snow depth, and share their reports online.

All you need is a high-quality rain gauge, which is provided for Kansas residents, and internet access to be a CoCoRaHS observer.

No experience is needed. Free training is provided online.

Cooperative Observers

This section is dedicated to information directed towards our Cooperative Observing Program

Station Visits

Annual station visits will be finished up this spring. The outside temperature units will be cleaned and the rain gauges leveled. The automated rain gauges will be summerized the first and second weeks in May. If you need any supplies or need equipment moved or worked on give us a call at 1-800-824-9943. Ask for Jesse Lee. If I am not in the office you can leave a message and I will get back to you. If you have any questions at all feel free to call or e-mail me. My e-mail address is jesse.lee@noaa.gov.

Awards Presented

John Lehman of Coldwater was presented with the 2017 Thomas Jefferson Award on April 4th, 2018 by Ken Harding, Acting Regional Director for the National Weather Service from Kansas City. **This is the highest award that a Cooperative Weather Observer can receive.** This award is named in honor of our third president who kept an almost unbroken series of weather records from 1776 until 1816. Five cooperative observers across the country are honored with this award each year for outstanding and distinctive achievements. John also received congratulatory letters from Senators Pat Roberts and Jerry Moran, Representative Roger Marshall and former Governor Sam Brownback. Congratulations to John!

Nanc Burns of Meade, **Bill Greenway** of McCracken and **Lance Morgan** of Alexander were presented with 30 year length of service awards, **Darrell Woods** of Kalvesta with a 25 year length of service award, **Pam Wetzel** near Offerle with a 20 year length of service award, **Swede Holmgren** of Ellis with a 15 year length of service award and **Steve Barker** of Satanta with a 10 year length of service award. Congratulations to all!

Upcoming Length of Service Awards

The following will receive Length of Service Awards! 30 years of service to **Bill & Barbara Schreiber** near Ransom and **Brad Harvey** south of Collyer; 25 years of Service for **Amos Yost** of Montezuma; 20 years for **Ted Alexander** near Sun City, **Dennis Brown** near Bellefont and **Dan Frick** of Ness City; and 10 years for **Robert Mitchell** near Loretta.

8 Inch Standard Rain Gauges

If you have not already done so, you may put the inner tube back in the rain gauge & put the funnel on top.

New Observer

Shaina Ebeling has replaced **Russell Oesterich** as the observer for Sun City and **David Rohrenback** has replaced **Alan Schweitzer** at the Johnson City Power Plant. We welcome to the program both Shaina and David.

WXCoder

For those who do not use the weather coder program, you can use it if you have a computer with internet and want to report your weather data every day. This is a website where you can enter your data and it would allow us to incorporate your station data in our daily report. If you are interested in using this program please give me a call and I will set you up with an account. For those who routinely use the program and still mail in their weather forms, you do not have to mail in the form. We can download the form here at the office. At the end of the month when you are done, check over your data to see if you have any missing temperature, precipitation or snow data entries. Please enter those if you have the data that is missing. If it is missing, please enter a M.

Jesse Lee, Observing Program Leader

National Weather Service, Dodge City KS

Are YOU prepared for Severe Weather?

Keep this section handy to help you and your family prepare for upcoming severe weather.

Know the Difference: Watch vs Warning

This is a fun way to describe the difference between a watch and a warning.

If your location is under a Thunderstorm or Tornado Watch:
Ingredients are there for severe weather to form. BE READY. Make sure you have a way to receive updates.

If your location is under a Thunderstorm or Tornado Warning:
Severe Weather is in or near your area. Take Action! Get to a shelter even if you can't see danger.

Image Courtesy of Brad Panovich.

Understanding Severe Thunderstorm Risk Categories

THUNDERSTORMS (no label)	1 - MARGINAL (MRGL)	2 - SLIGHT (SLGT)	3 - ENHANCED (ENH)	4 - MODERATE (MDT)	5 - HIGH (HIGH)
No severe* thunderstorms expected	**Isolated severe thunderstorms possible**	**Scattered severe storms possible**	**Numerous severe storms possible**	**Widespread severe storms likely**	**Widespread severe storms expected**
Lightning/flooding threats exist with all thunderstorms	Limited in duration and/or coverage and/or intensity	Short-lived and/or not widespread, isolated intense storms possible	More persistent and/or widespread, a few intense	Long-lived, widespread and intense	Long-lived, very widespread and particularly intense
					
• Winds to 40 mph • Small hail	• Winds 40-60 mph • Hail up to 1" • Low tornado risk	• One or two tornadoes • Reports of strong winds/wind damage • Hail ~1", isolated 2"	• A few tornadoes • Several reports of wind damage • Damaging hail, 1 - 2"	• Strong tornadoes • Widespread wind damage • Destructive hail, 2" +	• Tornado outbreak • Derecho

* NWS defines a severe thunderstorm as measured wind gusts to at least 58 mph, and/or hail to at least one inch in diameter, and/or a tornado. All thunderstorm categories imply lightning and the potential for flooding. Categories are also tied to the probability of a severe weather event within 25 miles of your location.

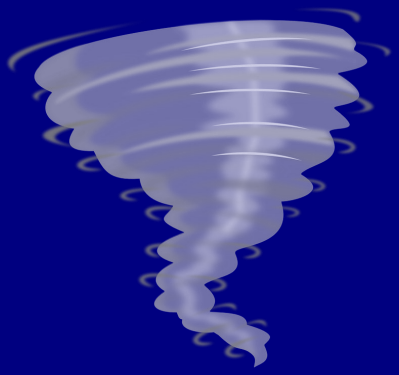
In the severe weather graphics we issue, you'll often see categories defining the severity/risks of storms. The Storm Prediction Center issues Day 1, Day 2, and Day 3 Convective Outlooks that classify the risk/severity of thunderstorm threats across the contiguous United States. We use these classifications to alert you of the potential severity of upcoming storms. Thunderstorms and Marginal risk categories are most common here in Southwest Kansas, with High Risk days being the least common.

Understanding Severe Weather Hazards

Tornado	Tornadoes are violently rotating columns of air that can destroy buildings and cause significant injury or death ACTION: Take shelter immediately in a sturdy structure
Large Hail	Hail can damage vehicles, crops, buildings, and cause injuries ACTION: Move indoors away from windows
Strong Wind	Strong wind can knock over trees and damage buildings ACTION: Move indoors away from windows
Heavy Rain	Heavy rain can cause flash flooding ACTION: Avoid rising creeks and water-covered roads
Lightning	Lightning strikes can cause significant injury or death ACTION: Move indoors if you hear thunder

Weather-Ready Nation
National Oceanic and Atmospheric Administration
National Weather Service
weather.gov/tornado

95 average # of tornadoes per year in Kansas
(30-yr average 1988-2017)



Kansas is **2nd** in the country for tornado occurrences

Tornado Safety: *Preparation for tornadoes is key to staying safe and minimizing impacts*

- **Be Weather-Ready:** Check the forecast regularly to see if you're at risk for tornadoes. Listen to local news or a NOAA Weather Radio to stay informed about tornado watches and warnings.
- **Sign Up for Notifications**: Know how your community sends warnings. Some communities have outdoor sirens. Others depend on media and smart phones to alert residents of severe storms capable of producing tornadoes.
- **Create a Communications Plan**: Have a family plan that includes an emergency meeting place and related information. Pick a safe room in your home, such as a basement, storm cellar, or an interior room on the lowest floor with no windows.
- **Practice Your Plan:** Conduct a family severe thunderstorm drill regularly so everyone knows what to do if a tornado is approaching. Make sure all members of your family know to go there when tornado warnings are issued. Don't forget pets if time allows.
- **Prepare Your Home:** Consider having your safe room reinforced. You can find plans for reinforcing an interior room to provide better protection on the Federal Emergency Management Agency website.
- **Help Your Neighbor**: Encourage your loved ones to prepare for the possibility of tornadoes. Take CPR training so you can help if someone is hurt.

Tornado Shelter Tips

Tornado!? What to do if you aren't at home:

Outside: Seek shelter inside a sturdy building immediately if a tornado is approaching. Sheds and storage facilities are not safe.

In a vehicle: Being in a vehicle during a tornado is not safe. The best course of action is to drive to the closest shelter. If you are unable to make it to a safe shelter, drive into a ditch, get as low as possible with your seatbelt attached, and cover your head.

At Your Workplace or School: Follow your tornado drill and proceed to your tornado shelter location. Stay away from windows and do not enter large, open rooms.

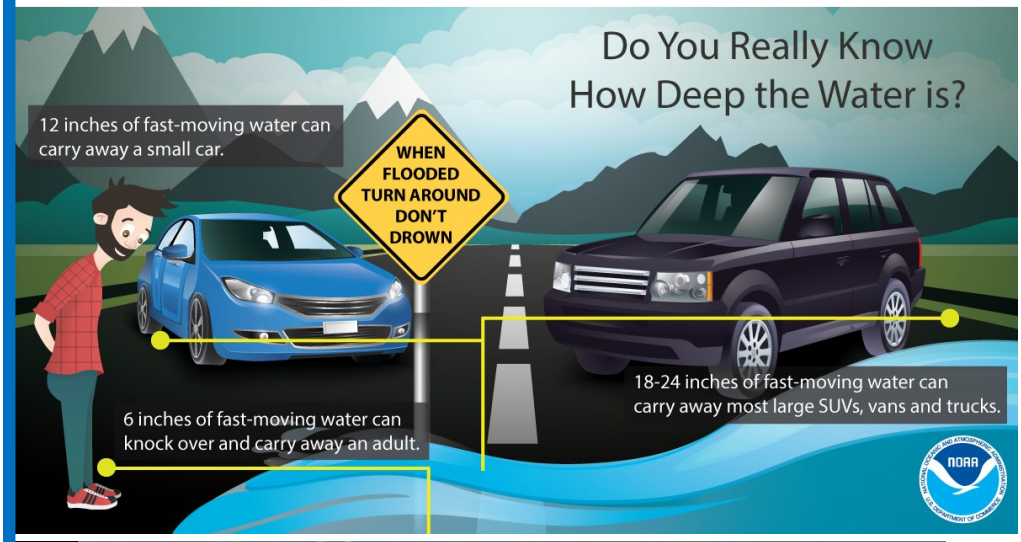
Wind Safety: Southwest Kansas is a windy place

THUNDERSTORM STRAIGHT LINE WINDS

- ✓ Straight line winds can exceed 100 mph, and affect large areas.
- ✓ Strong winds can knock over semi-trucks, trees and powerlines.
- ✓ Stay indoors away from windows.
- ✓ Avoid trees, power lines, and objects that could blow around.
- ✓ If driving, slow down and keep two hands on the wheel.

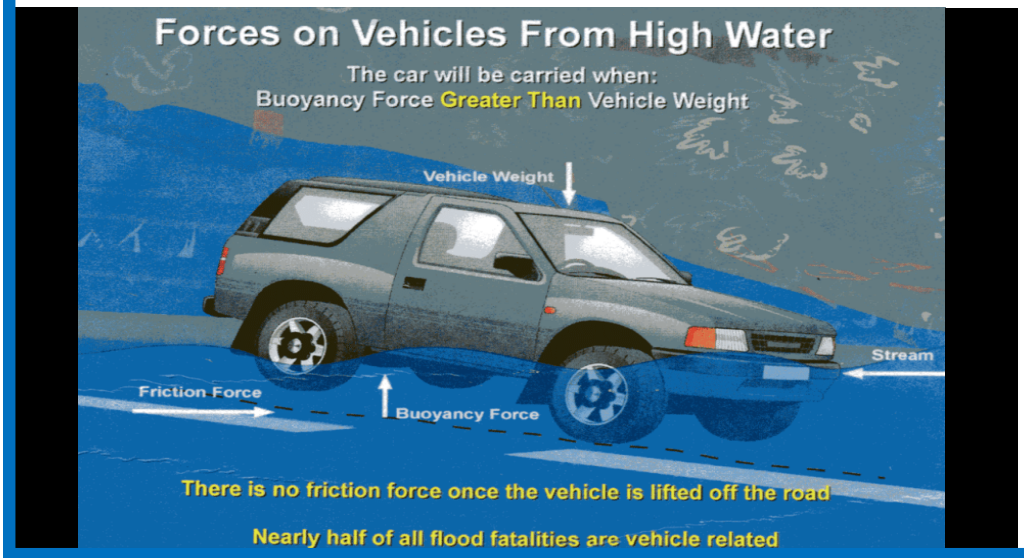
Lightning Safety: When thunder roars, go indoors

Heavy Rain Safety: Heavy rain can bring flash flooding



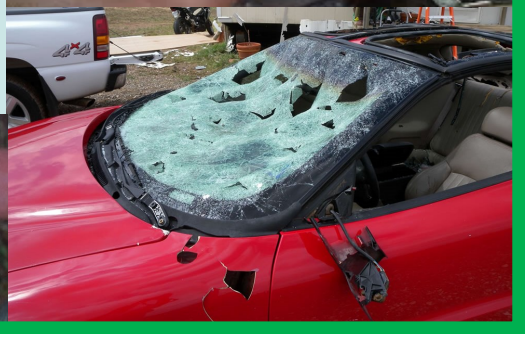
Flood Safety Tips

- Turn Around, Don't Drown
- Obey posted road closures
- A foot of moving water can sweep a car off the roadway
- Be Alert of rising water levels and move to higher ground



Hail Safety

- Take cover immediately before hail falls
- Cars provide shelter up to golf ball size
- Keep blankets in your car to protect yourself if the glass breaks
- Find an awning, a gas station overhang or an overpass (away from traffic and NOT during a tornado!)
- Canvas awnings and tents are not safe shelters



Severe Weather Safety Worksheet

Have a plan! Fill out this page and place on your fridge or other highly-visible area.

Where To Go For Safety

Take shelter immediately if a Tornado Warning is issued for your area. The safest places in your home are underground and under a sturdy object, like the stairwell. If you don't have a basement, go to a bathroom or small closet on the lowest floor and as far away from windows and outside walls as possible. If you are in a mobile home, evacuate to a substantial structure. The designated tornado shelter for our home is:

_____

Conduct a Tornado Drill

Pick a day each year that you and your family will remember and conduct a drill. It's easy and only takes a few minutes. What day will you conduct your annual tornado drill? _____

When To Go For Safety

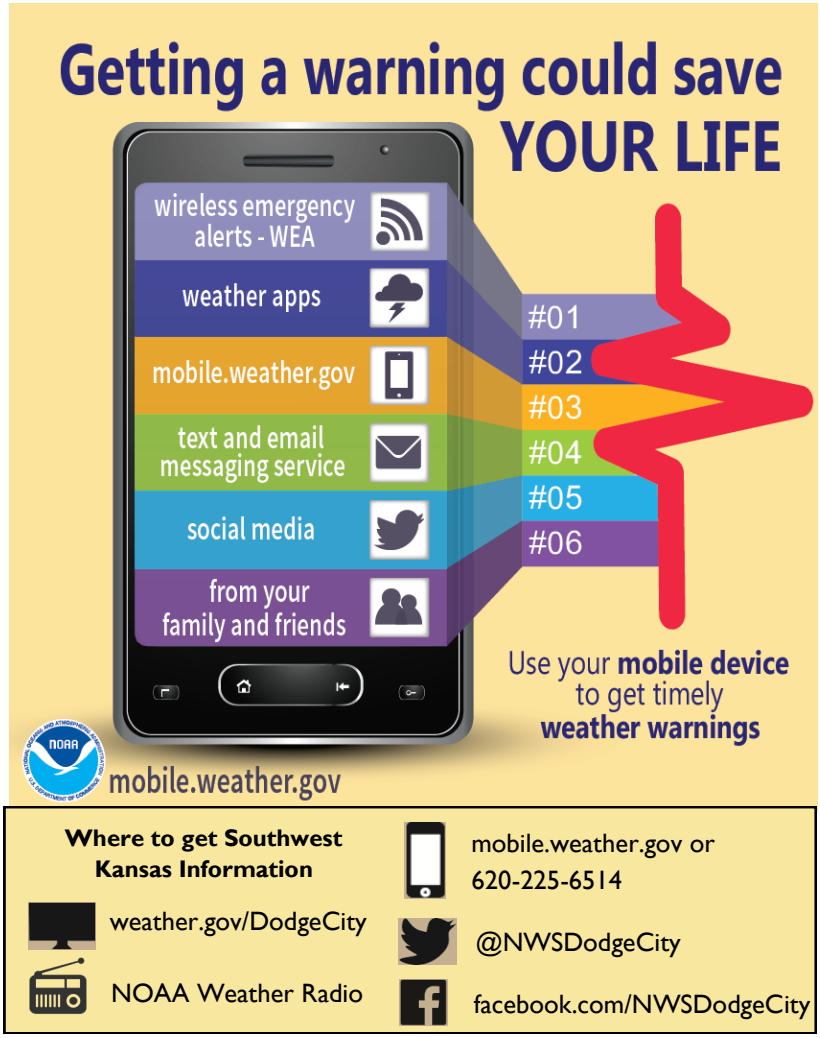
The sooner you know bad weather is coming, the sooner you'll be ready to take action.

1. Each morning, check out the day/week's forecasts and note any mention of severe weather potential. (Below we list several ways to look up the weather forecast.)
2. Look or listen for follow-up information during the course of the day.
3. Use good judgement! If threatening clouds are moving in, it's probably time to prepare for action.

We hope you never have to use a disaster supply kit, but if you ever do, you'll be glad you put one together in advance. Place this in your storm safe room/shelter.

Disaster Supply Kit

- ✓ Food and Water
- ✓ Weather Radio (Battery Powered)
- ✓ Flashlights & Batteries
- ✓ Cell phone (With Charger or Spare Battery)
- ✓ First Aid Kit
- ✓ Pair of Shoes
- ✓ List of Emergency Contacts
- ✓ Whistle to signal for Help
- ✓ Prescription Medicine



Where to get Southwest Kansas Information

- weather.gov/DodgeCity
- NOAA Weather Radio
- mobile.weather.gov or 620-225-6514
- @NWSDodgeCity
- facebook.com/NWSDodgeCity

NWS DODGE CITY EMPLOYEE'S PHOTOGRAPHY TO BE EXHIBITED AT THE CARNEGIE CENTER FOR THE ARTS

Exhibit opening scheduled during Dodge City Final Fridays

Together Mike Umscheid and Scott Reiter have more than 35 years of meteorology experience at the National Weather Service in Dodge City. By profession, Mike is a lead forecaster who started at the Dodge City office as a general forecaster 2002. Scott is the office's Information Technology Officer, who started in 1998 also as a general forecaster. Outside of work, they have both developed a talented eye for photography, which will be exhibited at the Carnegie Center for the Arts beginning at the June (for Scott) and the August (for Mike) Final Friday Art Events in downtown Dodge City.

Mike is best known throughout Southwest Kansas as the forecaster who issued the tornado emergency for the Greensburg tornado in 2007. In his spare time, he shoots nature photography with emphases on birds and severe storms. He became serious about storm photography when he got his first digital SLR camera in 2005 for storm chasing. As his photography passion grew, he wanted to expand his subject matter since severe weather is seasonal. He got hooked on bird photography when he shot Sandhill Cranes at Quivira National Wildlife Refuge. He now takes two photography vacations a year: in the spring he takes what storm chasers call a "chasecation" to photograph severe storms, and in the winter he takes a bird photography trip. Mike's photography has won several awards, including a grand prize award at the Shafer Art Gallery in Great Bend for a Sandhill Crane photograph during the "Choreography of Cranes" show in 2013.

Sandhill Symmetry image by Mike Umscheid won Grand Prize at the "Choreography of Cranes" art contest.

Mike has already had two Final Friday Art Shows at the Dodge City Brewery. On August 31, he will showcase his severe storm and bird photography in an exhibit opening during Final Fridays in Downtown Dodge City at the Carnegie Center for the Arts from 5pm to 7pm. If you can't make it to the exhibit opening, his photography will remain on display through the month of September.

Scott's interest in photography developed when he lived in Colorado and wanted to capture the beauty of the landscape. After moving to Dodge City, Scott was influenced by

House Finch on a chilly day by Scott Reiter.

Mike's passion for photography, which caused him to take his hobby more seriously. Shortly thereafter he began redReiter Photography. His favorite subjects to photograph became landscapes in Utah, birds and macro photography. He started entering his images in shows and has won multiple ribbons at Garden City Arts, and a "Best in Show" at the Carnegie Center for the Arts for a macro image of a Cucumber Beetle.

Scott will once again be showcasing his photography at the Carnegie Center for the Arts, this time landscape and bird images, at the June 29 Final Friday from 5pm to 7pm. Scott's wife Joni, who is a talented quilter, will have her quilt work exhibited as well. Their work will be on display for the month of July if you can't make the opening.

Caligo Brazilienis that won first place in its category by Scott Reiter

A large tornado photographed from Highway 283 north of Hill City on June 20, 2011 by Mike Umscheid.

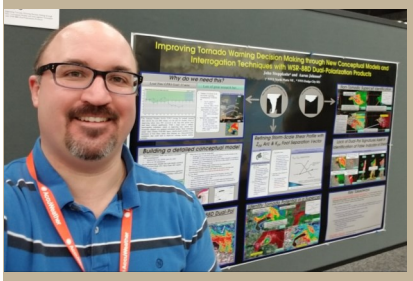
Exhibition Details:

	Exhibit Opening	Exhibit Ends	Website
Scott Reiter's Photography	June 29, 5pm-7pm	July 26	www.redReiter.com
Mike Umscheid's Photography	August 31, 5pm-7pm	September 27	www.MikeUmscheidPhotography.com

Carnegie Center for the Arts is located at 701 N 2nd Ave, Dodge City, Kansas 67801

Dodge City NWS Office News

American Meteorological Society Annual Meeting



Science and Operations Officer Aaron Johnson attended the 98th Annual Meeting of the American Meteorological Society in Austin Texas in January, where he showcased research he is working on with John Stoppkotte (NWS North Platte) on "Improving Tornado Warning Decision Making through New Conceptual Models and Interrogation Techniques with WSR-88D Dual-Polarization Products".

New Geothermal System Installed

A brand new geothermal heating and cooling system was installed at NWS Dodge City in the fall. Ten wells were dug outside of the office to aid in heating and cooling of the building to ultimately cut energy costs.

2018 3i Show

The 3i show was moved to March, where we once again had a booth. The Van de Graaff generator was used to teach lightning safety, and Meteorologist Wesley Hovorka and Lead Forecaster Matt Gerard, among others ,answered weather questions.

2018 Spotter Talks

Every spring, the NWS Dodge Cityoffers spotter talks in all 27 counties in our Warning Area. It's a great way to learn more about severe weather, and get to know your NWS staff. Here is Warning Coordination Meteorologist Jeff Hutton presenting in Finney County. Try to attend one in 2019 as they are not only informative, but fun!

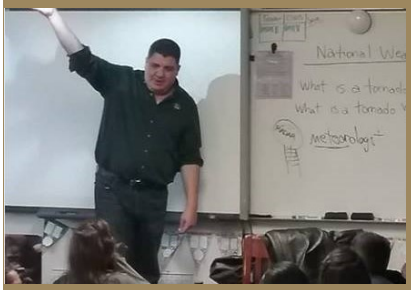
Career and Science Fairs

We present at Career Fairs and Judge Science Shows throughout the year. Here is Larry Ruthi, Meteorologist in Charge presenting at Dodge City Middle School Career Fair. Visits were also made to the Cimarron Middle School Career Fair, and the Pratt County,

Kansas Integrated Weather Team

NWS Dodge City participated in the Kansas Integrated Weather Team in Jan., which promotes collaboration and communication between all weather partners and first responders in order to save lives and property.

School Visits



We make many school visits each year, teaching science and weather concepts. Here is Bill Turner, Lead Forecaster, at Central Elementary. Vsits were also made to Soule Elementary, Comanche Middle School, Beeson Elementary, Ross Elementary, Spearville Elementary, Northwest Elementary, Dodge City Middle School, among others.

Weather Radio Programing Event

NWS Dodge City participated in NOAA Weather Radio programming events this spring, in cooperation with KAKE TV, Dillons, Midland Corporation and Orscheln Farm & Home. It's a great opportunity to meet-and-greet with meteorologists and, of course, get your weather radio programmed. Watch our Facebook and Twitter accounts for future programming events!

Summer Weather Word Search

By Wesley Hovorka, Meteorologist

Find these meteorological terms!

B	D	H	J	X	H	C	B	V	J	S	K	F	O	F
T	S	U	G	C	A	N	D	A	Q	O	M	L	D	V
V	H	H	O	P	L	I	A	H	K	Y	V	O	A	Y
X	D	U	E	L	F	U	N	N	E	L	W	O	N	F
I	M	I	N	A	C	B	K	O	L	N	X	D	R	M
S	A	E	C	D	R	L	X	R	B	A	O	T	O	S
L	L	S	I	E	E	P	L	U	W	F	T	K	T	D
O	I	I	H	B	O	R	R	A	E	N	I	B	E	S
Q	G	V	F	A	U	S	S	N	W	H	G	V	U	H
J	H	I	C	I	T	R	I	T	L	X	N	I	A	W
Y	T	S	E	R	B	L	Z	W	O	K	O	P	Y	S
J	N	K	D	J	Y	L	L	E	C	R	E	P	U	S
V	I	V	O	R	F	I	I	F	D	B	M	Z	B	K
X	N	P	D	B	J	V	V	L	A	K	R	Q	L	K
D	G	X	U	C	F	Q	B	F	C	P	Y	S	N	R

- **C.A.P.E.:** An acronym for Convective Available Potential Energy and is an indicator of atmospheric instability.
- **Flood**: An overflow of water onto normally dry land.
- **Lightning**: A visible electrical discharge produced by a thunderstorm.
- **Thunderstorm**: A local storm produced by a cumulonimbus cloud and accompanied by lightning and thunder.
- **Downburst**: A strong downdraft current of air from a cumulonimbus cloud, often associated with intense thunderstorms. Downdrafts may produce damaging winds at the surface.
- **Funnel**: A condensation cloud extending from the base of a towering cumulus associated with a rotating column of air that is not in contact with the ground (and hence different from a tornado). A condensation funnel is a tornado, not a funnel cloud, if either a) it is in contact with the ground or b) a debris cloud or dust whirl is visible beneath it.
- **Shear**: Variation in wind speed (speed shear) and/or direction (directional shear) over a short distance within the atmosphere.
- **Tornado**: A violently rotating column of air, usually pendant to a cumulonimbus, with circulation reaching the ground.
- **Dryline**: A narrow zone of extremely sharp moisture gradient and little temperature gradient. It separates moist air from dry air. Severe weather can be associated with this boundary.
- **Hail**: Showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud.
- **Supercell**: Short reference to Supercell Thunderstorm; potentially the most dangerous of the convective storm types. Storms possessing this structure have been observed to generate the vast majority of long-lived strong and violent (F2-F5) tornadoes, as well as downburst damage and large hail. It is defined as a thunderstorm consisting of one quasi-steady to rotating updraft which may exist for several hours.
- **Wall Cloud**: A localized, persistent, often abrupt lowering from a rain-free base of a thunderstorm.

National Weather Service

Dodge City

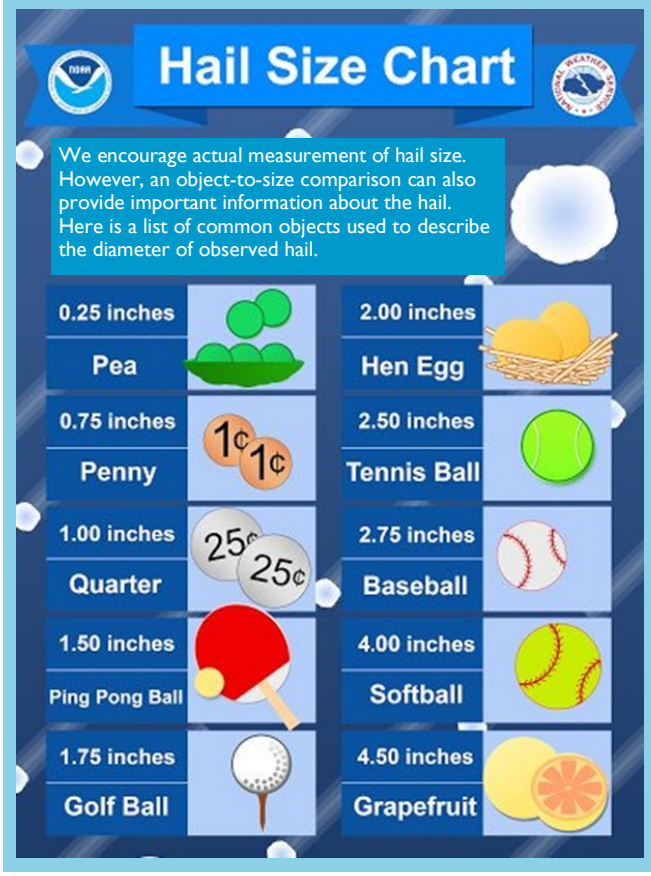
104 Airport Rd.

Dodge City, KS 67801

620-225-6514

Your *National Weather Service provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.*

Reporting Severe Weather to the National Weather Service



We need your report!

During severe weather and winter storms, the NWS uses reports from the public and trained spotters as ground truth to supplement tools such as satellite and radar, giving decision makers added confidence as they issue warnings. Reports also help the NWS verify warnings and improve future warning techniques.

Type of reports we need:

- Tornado
- Funnel Cloud
- Rotating Wall Cloud
- Flash Flooding
- Hail 1-inch Diameter or Larger
- Precipitation Type
- Rainfall Amounts
- Snow/Ice Accumulations
- Wind Speed Greater than 58 mph
- Storm Damage

What we need when you report:

- Images preferred!
- Your report
- Location (as exact as possible)
- Time report occurred

Reports can be submitted to:

- Twitter: @NWSDodgeCity
- Facebook: Facebook.com/NWSDodgeCity
- Online Portal: https://inws.ncep.noaa.gov/report/
- mPing: Submit using the mPing App